BIOLOGICAL EVALUATION OF ANTHELMINITIC ACTIVITY OF ROOT EXTRACT OF Tephrosia Purpurea IN INDIAN ADULT EARTHWORM


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ABSTRACT

Tephrosea purpurea is a copiously branched herbaceous perennial plant distributed throughout the tropics which is used in the treatment of diuretics, pimple, tonic, laxative, cough, tumour and bronchitis. The present study is an attempt to explore the Anthelminitic activity of aqueous and methanolic extract of roots of plant Tephrosea purpurea. The various concentrations of aqueous and methanolic extract were evaluated for their Anthelminitic activities on adult Indian earthworms Isenia Foetida. The activities are well compared with the standard drug Piperazine citrate. Methanolic and aqueous extract of roots of Tephrosea purpurea shows significant anthelmintic activity in Indian adult earthworms.

KEYWORDS: Tephrosea purpurea, Anthelminitic activity, Earthworms, Methanolic root extract and aqueous root extract.

INTRODUCTION

Tephrosea purpurea commonly known as Thila in Guajarati, Sarpankh (Hindi), Unhali (Marathi) is not official in Ayurvedic Pharmacopoeia.[1] It is one of the plant for human being made and gifted by the nature having composition of all essential constituent that are required for good human health.[2,3] Medicinally, all parts of the plant have tonic and laxative properties. The root is having bitter bad taste and it is an alexipharmic used in snake bite poisoning, ulcers, wounds, diarrhoea, bronchitis, asthma, inflammation, boils, pimples, enlargement of the spleen.[4,5] Leaves are tonic to the intestine, improves the appetite, useful
in diseases of lungs and chest, good in piles, syphilis and gonorrhea. The seeds are useful in poisoning due to rat-bite. The whole plant is bitter in taste and acrid, digestible, alexeteric, antipyretic, and cures diseases of liver, spleen, heart, kidney, blood, tumours, ulcers, leprosy, asthma, caries of the teeth and febrile attacks. Fresh root back ground and made in to a pill, with a little black pepper, is frequently given in cases of obstinate colic. *Tephrosea purpurea* have revealed the presence of glycosides, retinoid, isoflavones, flavanones, chalcones, flavanols, and sterols. It is also good source of minerals and amino acids. HPLC analysis of extract of flowering plant of *Tephrosea purpurea* shows presence of rutin and quercetin. Helminthes infections are the most common infections in humans, and pose a large threat to public health. Helminthes also affect millions of livestock resulting in considerable economic losses in farm yard animals. Helminthiasis or infection with parasitic worms are the most common infectious agents of humans in developing countries and produce a global burden of disease that exceeds better-known conditions i.e., tuberculosis and malaria. The disease is highly prevalent particularly in third world countries due to poor management practices. The Helminthes infections which infect the intestine are cestodes. In the presence work the methanolic and aqueous extract of roots of *Tephrosea purpurea* were evaluated for its anthelmintic activity against earthworms. The activities of extract were compared with standard drug piperazine citrate.

**Ethno pharmacological activities**

*Tephrosia Purpurea* is used to cure several types of external wounds and gastro-duodenal disorders. The plant has also been claimed to cure kidney, liver spleen, heart and blood related disorders, the dried herbs are effective as tonic laxative, diuretics, and used in the treatment of bronchitis, bilious febrile attack, boils, pimples.

**MATERIALS**

**Collection and Identification of Plant**

The Roots of *Tephrosea purpurea* was collected from Mangalwedha taluka, Solapur district Maharashtra. The identification of plant and authenticated department of Botany Yaswantrao chavan Institute of science, Satara District–Satara.

**Pretreatment of Plant**

The plant roots were initially cleaned, dried under room temperature. The dried roots were taken in mixture grinder and powdered. The powder was extracted in a soxhlet apparatus using methanol and distilled water as a solvent. Extracts were subjected to rotary vacuum
evaporation. Various physico-chemical analysis were performed to identify the chemical constituents.

**Preparation of Aqueous Extracts**

Accurately weighed 30 gm of powder was packed in thimble flask and 300ml distilled water was added in 500ml round bottom flask. The vapours arising from the flask pass by the side tube into condenser. Then soxhlet assembly was set up to complete 9 to 10 cycles. After that the extract was filtered. Filtration of mixture was carried out. Filtrate was taken into petry plate and evaporated until it converted into semisolid concentrated juice. After that it was dried completely to get dried residue, which can be used to prepare the stock solution (w/v) and the % yield was found to be 7.56 % w/w and stored in the freezer.

**Preparation of methanolic extraction**

Accurately weighed 30 gm of powder was packed in thimble flask and 300ml methanol was added in 500 ml round bottom flask. The vapours arising from the flask pass by the side tube into condenser. Then soxhlet assembly was set up to complete 6 to 7 cycles. After that the extract was filtered. Filtration of mixture was carried out. Filtrate was taken into petry plate and evaporated until it converted into semisolid concentrated juice. After that it was dried completely to get dried residue, which can be used to prepare the stock solution (w/v) and the % yield was found to be 6% w/w and stored in the freezer.

**Method**

The anthelmintic activity was performed as per the method of Pal et al with minor modifications. Three groups containing one earthworms each of approximately equal size were released into 1ml of desired formulation each group was treated with piperazine citrate, methanolic extract and aqueous extract. Time for paralysis was noted when no movement is observed with a slight pin prick method. Time for death of individual earthworms was recorded when the worms showed no movement either by vigorous shaking or by dipping in 40°C warm water.

**Preliminary phytoc hemical screening of methanolic Root extract of Tephrosia purpurea**

The hydroalcoholic extract was taken for various qualitative chemical tests to determine the presence of various phyto constituents like alkaloids, glycosides, carbohydrates, phenolics and tannins, phytosterols, fixed oils, protein and amino acids, flavanoids, saponins, gums and mucilage using reported method. The predominant action of Piperazine citrate on worm is
inhibitory action on micro tubular function. Phytochemical analysis of methanolic Root extract showed the presence of tannins and phenolic compounds as one of the chemical constituents along with alkaloids. Tannins and phenolic compounds were shown to possess anthelmintic activity.[15,16]

Observation

“Fig. 1” Effect of *Tephrosia purpurea* of Aqueous extract on Indian adult earthworm.

“Fig. 2” Effect of *Tephrosea purpurea* Effect of Methanolic extract on Indian adult earthworm.

RESULTS AND DISCUSSION

Anthelmintic activity against earthworms

The methanolic and aqueous extracts of roots of *Tephrosea purpurea* were evaluated in Indian adult earthworms and time for paralysis and death is as given below:

Table no: 1
<table>
<thead>
<tr>
<th>Group</th>
<th>Concentration of extract in mg/ml</th>
<th>Time taken in minutes</th>
<th>Paralysis</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methanolic extract</td>
<td>25</td>
<td>15.33</td>
<td>24.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>5.56</td>
<td>12.46</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>3.36</td>
<td>6.56</td>
<td></td>
</tr>
<tr>
<td>Aqueous extract</td>
<td>25</td>
<td>21.32</td>
<td>40.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>28.44</td>
<td>34.35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>9.42</td>
<td>14.36</td>
<td></td>
</tr>
<tr>
<td>Piperazine citrate</td>
<td>25</td>
<td>52.07</td>
<td>58.68</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>30.10</td>
<td>33.06</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>13.45</td>
<td>18.17</td>
<td></td>
</tr>
</tbody>
</table>

The activity was compared with standard drug piperazine citrate. Methanolic and aqueous extract both show significant anthelminitic activity against Indian adult earthworms. Methanolic extract shows more effect as compared to aqueous extract. The methanolic extract Tephrosea Purpurea confirmed paralysis as well as death of worms in a good time as compared to piperazine citrate especially in higher concentration of 100mg/ml. The aqueous extract also showed significant activity, Phytochemical analysis of the crude extracts revealed presence of saponin, steroids, alkaloids, triterpenoids and bitter principles as are the chemical constituents. Triterpenoids and bitter principals are known to have anthelmintic activity. Tannins are found to bind to free proteins in the gastrointestinal tract of the host animal or glycoprotein on the cuticle of the parasite and cause death.[17]

CONCLUSION
From above study it is confirm that methanolic and aqueous extract of roots of *Tephrosia purpurea* shows anthelminitic activity in Indian adult earthworms.

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